REMARKS

The Examiner's Action mailed on March 7, 2007, has been received and its contents carefully considered.

In this Amendment, Applicant has amended claims 1- 4 and 6-10, canceled claim 5, and added claims 11-17. Claims 1 and 6 are the independent claims. Claims 1-4 and 6-17 are pending in the application. For at least the following reasons, it is submitted that this application is in condition for allowance.

The Examiner has objected to the disclosure for various informalities. Since the disclosure has been amended as suggested by the Examiner, it is submitted that the disclosure complies with all official requirements. This objection thus should be withdrawn.

The Examiner has rejected claims 1-10 under 35 USC §112 as not having a sufficient antecedent basis for the limitation "said binarization threshold." In response, claim 1 has been amended to recite "a second binarization threshold" and "said second binarization threshold," wherein "a second binarization threshold" is an antecedent basis for "said second binarization threshold." It is thus submitted that claims 1-4 and 6-10 comply with all official requirements. Moreover, claim 5 has been canceled, effectively rendering the rejection directed to this particular claim moot. Accordingly, this objection should be withdrawn.

The Examiner has rejected claims 1-3 and 7-8 as being obvious over *Tagami et al.* (US Pat. Pub. No. 2004/0218787) in view of *Wootton et al.* (USP 5,956,424). The Examiner has also rejected claim 4 as being obvious over *Tagami et al.* in view of *Wootton et al.*, and further in view of *Srinivasa* (US Pat. Pub. No. 2004/0042676). The

Examiner has further rejected claims 5-6 and 9-10 as being obvious over *Tagami et al.* in view of *Wootton et al.*, and further in view of *Krumm et al.* (USP 6,788,818) (hereafter simply *Krumm*). Claim 1 has been amended to specify the features recited in original claim 5. Accordingly, Applicant will treat the rejection of original claim 5 as pertaining to amended independent claim 1, and claims 2-4 and 7-10 that depend from claim 1. It is submitted that claims 1-4 and 6-10 are clearly patentable over the cited references for at least the following reasons.

Amended independent claim 1 is directed to a method for detecting motion pixels in an image. As disclosed by Applicant's specification, a conventional method uses pixel values whose absolute values are greater than a preset threshold are used as a binarization threshold indicating motion pixels. However, in the conventional method, an erroneous judgment of motion pixels occurs due to an illumination change. Applicant's claimed invention overcomes this problem by using a difference image and an updated difference image and by using all or part of pixel values in the difference image to obtain the updated difference image. Amended claim 1 specifies a step of finding a first binarization threshold from a distribution of all absolute pixel values in a difference image between a current image and a background image. Amended claim 1 further specifies that the step of finding the first binarization threshold includes sub-steps of (1) counting occurrences of all absolute pixel values to plot a cumulative histogram of pixel values, wherein a transverse axis of the cumulative histogram indicates all possible absolute pixel values arranged in ascending order, and a longitudinal axis indicates a cumulative occurrence count equal to or smaller than the absolute pixel values, (2) defining two linear segments constructed by (i) an occurrence

count of the minimum absolute pixel value, (ii) the cumulative occurrence count of the absolute pixel values equal to or smaller than a selected absolute pixel value between the minimum and maximum absolute pixel values and (iii) the cumulative occurrence count of the absolute pixel values equal to or smaller than the maximum absolute pixel value, wherein the selected absolute pixel value includes all possible absolute pixel values between the minimum and maximum absolute pixel values, (3) defining the coordinate of every point in the two linear segments as (i, L_i), and defining the coordinate of every point in an envelope line of the cumulative histogram as (i, E_i), and (4) finding, among the selected pixel value, a pixel value that minimizes at least one of the sum $\sum_i |L_i - E_i|$, the sum $\sum_i (L_i - E_i)^2$, and the sum of the maximum correlation coefficient of $\{L_i\}$ and $\{E_i\}$ sequences, so as optimally to approximate the cumulative histogram, and designating the minimizing pixel value as the first binarization threshold. These features are not disclosed, suggested, or taught by the cited references.

Tagami et al. and *Wootton et al.* do not teach of a histogram plot for their calculated data, as acknowledged by the Examiner. Accordingly, these cited references do not disclose, suggest or teach the step of finding the first binarization threshold that includes sub-steps recited in amended claim 1.

Then, the Examiner draws attention to *Krumm*. *Krumm* is directed to a method for computing the probability of false alarms when using histogram matching to find objects in images. However, *Krumm* does not disclose, suggest, or teach the step of finding the first binarization threshold recited in amended claim 1.

The Examiner states that, because Fig. 4 of *Krumm* shows a histogram containing false alarm data, *Krumm*'s histogram reads on the claimed histogram.

However, Fig. 4 is a chart showing results of false alarm tests wherein an exact compensation and an approximate compensation overlap almost exactly (see *Krumm*, at col. 5, lines 60-62 and col. 17, lines 18-24). A transverse axis of *Krumm*'s histogram indicates the square window dimension, e.g., 10 x 10 to 20 x 20 (see *Krumm*, at col. 17, lines 9-12 and lines 33-35, Figure 4), whereas, in amended claim 1, the transverse axis of the histogram indicates all possible absolute pixel values arranged in ascending order. In addition, a longitudinal axis of *Krumm*'s histogram indicates the false alarm probability corresponding to the square window dimension (see *Krumm*, at col. 17, lines 11-12, Figure 4), whereas, in amended claim 1, the longitudinal axis indicates a cumulative occurrence count equal to or smaller than the absolute pixel values.

Moreover, *Krumm*'s histogram verifies the mathematical modeling of the exact analysis and only justifies the approximation (see *Krumm*, at col. 17, lines 22-24). However, *Krumm*'s histogram does not provide anything about how to approximate the exact analysis. In contrast, the step of finding the first binarization threshold recited in amended claim 1 optimally approximates the cumulative histogram by including the sub-step of defining two linear segments, the sub-step of defining the coordinate of every point in the two linear segments as (i, L_i), and defining the coordinate of every point in an envelope line of the cumulative histogram as (i, E_i), and the sub-step of finding, among the selected pixel value, a pixel value that minimizes at least one of the sum $\sum_i |L_i - E_i|$, the sum $\sum_i (L_i - E_i)^2$, and the sum of the maximum correlation coefficient of $\{L_i\}$ and $\{E_i\}$ sequences.

Further, *Krumm*'s histogram does not disclose, suggest or teach how to determine a threshold. Instead, *Krumm* discloses a certain predetermined threshold in

which the test histogram should account for some large fraction α:$0<\alpha\leq 1$ of the counts in the model histogram (see *Krumm*, at col. 9, lines 54-59). More specifically, *Krumm* discloses the predetermined thresholds such as 0.75 (i.e., three of four pixels in the model histogram) at col. 13, line 24, and 0.9 (i.e., α=0.9) at col. 17, line 5. In contrast, amended claim 1 includes the step of finding the first binarization threshold that minimizes at least one of the sum $\sum_i | L_i - E_i |$, the sum $\sum_i (L_i - E_i)^2$, and the sum of the maximum correlation coefficient of $\{ L_i \}$ and $\{E_i\}$ sequences.

It is thus submitted that amended claim 1 is *prima facie* patentable over the cited references. Accordingly, claim 1 and the claims that depend from claim 1 should be allowed and the rejection be withdrawn.

Amended independent claim 6 is also directed to a method for detecting motion pixels in an image. Amended claim 6 includes features similar to those of claim 1. As remarked by the Examiner, claim 6 differs from claim 1 in that claim 6 specifies a cumulative occurrence percentage instead of the cumulative occurrence count recited in claim 1. It is submitted that amended claim 6, and the claims that depend from amended claim 6, are *prima facie* patentable over the cited references for at least the same reasons that amended independent claim 1 is patentable.

New claims 11-17 are also dependent from amended claim 6. It is thus submitted that these claims are *prima facie* patentable over the cited references for at least the same reasons that amended independent claim 1 is patentable.

It is therefore submitted that this application is in condition for allowance, and such a Notice, with allowed claims 1-4 and 6-17 earnestly is solicited.

Should the Examiner feel that a conference would help to expedite the prosecution of the application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview.

Respectfully submitted,

June 7, 2007
Date

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